

Summary of Initial Risk Assessment Report

2-Imidazolidinethione CAS No : 96-45-7

PRTR No of Japan: 32

This substance is assessed based on Guideline for Initial Risk Assessment Version 2.0

1. General Information

1.1 Physico-chemical properties

Appearance	White solid
Melting point	203-204 degC
Boiling point	No data available
Water solubility	20g/L (30 degC)
Henry's constant	$3.40 \times 10^{-2} \text{ Pa} \cdot \text{m}^3/\text{mol}$ ($3.36 \times 10^{-7} \text{ atm} \cdot \text{m}^3/\text{mol}$) (25degC, estimated)
Octanol/water partition coefficient (log Kow)	-0.66 (measured), -0.49 (estimated)
Soil adsorption coefficient	Koc = 7 (estimated)

1.2 Environmental fate

Bioaccumulation	Exhibits little to no bioaccumulation. Bioconcentration factor (BCF) : <0.2-0.3 (1 mg/L), <1.8 (0.1 mg/L) (Carp) ,measured
Biodegradation	Non-biodegradable
Stability in the environment	(In air) Reaction with OH radical: Reaction rate constant is $1.40 \times 10^{-10} \text{ cm}^3/\text{molecule} \cdot \text{sec}$. (25 degC, estimated) The half-life is 1-3 hours, given OH radical concentration of $5 \times 10^5 - 1 \times 10^6 \text{ molecule}/\text{cm}^3$: Reaction with ozone: No data Reaction with nitrate radical: No data Since 2-Imidazolidinethione does not absorb light > 290 nm , 2-Imidazolidinethione is not degraded directly by sunlight in air. (In water) Not expected to hydrolyze in the environmental water.
Environmental fate	If released into water, 2-Imidazolidinethione is not expected to be removed through biodegradation. However, in cases where the concentration of the substance is low, biodegradation may occur by microorganisms.

2. Sources of release to the environment

2.1 Annual production, import, export and domestic supply in 2004 (ton/year)

Production	Import	Export	Domestic supply	Remarks
347		--	--	

2.2 Uses

2-Imidazolidinethione is used for the imidazoline vulcanization accelerator (chloroprene rubber, epichlorohydrin rubber, and chlorinated polyethylene).

The chloroprene rubber product is processed to the covered conductor, the shoe sole, and footwear, etc.

2.3 Release from the industries within the scope of PRTR system (in 2004)

Release sources		Air (ton)	Waters (ton)	Soil (ton)	Remarks
Listed industries	Reported release	0.004	0	0	Release to river: 0 ton
	Release outside notification	2.1	0	0	
Release outside notification from non listed industry		--	--	--	
Households		--	--	--	
Mobile sources		--	--	--	
Total		2.1	0	0	

2.4 Releases from other sources

No information about release sources of the substance is available.

2.5 Main release route

There seems to be no emission of the substance in its manufacturing processes. 2-imidazolidinethione is expected to be released into air during its use in rubber manufacturing industries.

3. Exposure Assessment

3.1 Measured environmental concentration

No data

3.2 Estimated environmental concentration

Media	Estimated concentration	Description
Air (microg/m ³)	0.0030	Calculated by mathematical model / Atmospheric Dispersion Model for Exposure and Risk Assessment (AIST-ADMER) Ver.1.5
River water (microg/L)	0	According to 2004 PRTR data, the substance was not released to rivers. Therefore, the concentration in rivers was assumed to be 0 µg/L.

3.3 Estimated environmental concentration in water (EEC)

EEC(microg/L)	0
	The value 0 microg/L was used for the risk assessment, since the substance is not expected to be released to rivers ¹⁾ .

3.4 Estimated human intake

Intake route		Concentration used for estimation of intake	Estimated intake (microg/person/day)	Estimated intake (microg/kg-Bodyweight (BW)/day)
Inhalation	Air	0.0030 (microg/m ³)	0.060	0.0012
	The estimated concentrations in air was used for the risk assessment, since no measured concentration was available.			
Oral	Drinking water	0 (microg/L)	0	0
		The estimated concentration in river water was used as a substitute, since no measured concentration in drinking water was available.		
	Food	0 (microg/g)	0	0
		Data of intake via food were not available. Concentration in fish body was estimated as a product of a concentration in seawater and a BCF. The concentration in seawater was assumed to be 0 microg/L, since estimated concentration in river was 0 microg/L. Consequently, concentration in fish body was estimated to be 0 microg/kg.		
Subtotal		--	0	0
Total route		--	0.060	0.0012

4. Hazard assessment

4.1 Effects on organisms in the environment

	Acute or Chronic	Species	Endpoint	Concentration
Algae	Chronic	<i>Selenastrum capricornutum</i>	72 hours NOEC Growth rate	125 (mg/L)
Crustacea	Chronic	<i>Daphnia magna</i>	21 days NOEC Reproduction	2.50 (mg/L)
Fish	Chronic	<i>Oncorhynchus mykiss</i>	60 days LOEC Growth	100 (mg/L)
Key study		Data of crustacea (<i>Daphnia magna</i>) was chosen for the key study because effects were observed at the lowest concentration in the hazard assessment.		

4.2 Human health toxicity

Toxicity	Exposure route	Species	Duration / Dose method	Toxic effects (Key study is underlined)	NOAEL or LOAEL (converted)
Repeated dose toxicity	Inhalation	--	--	--	--
	Oral	Rat	24 months (mixed feed)	<u>Hyperplasia of thyroid gland (thyroid lobulation, follicular cell hypertrophy, hyperplasia of follicular epithelium, thyromegaly)</u> , reduced body weight gains, increased relative thyroid gland weight	LOAEL: 5 ppm (equivalent to 0.25 mg/kg/day)
	Dermal	--	--	--	--
Reproductive and developmental toxicity	Inhalation	Rat	From 21-42days before pregnancy until GD15, GD6-15, GD7-20 Gavage	Teratogenic effects (meningo-hernia, hydrocephalus, club fold, brevicaudate etc.)	NOAEL: 5 mg/kg/day
Carcinogenicity	Evaluation by IARC : Group 3 (Not classifiable as to its carcinogenicity to humans)				
Genotoxicity	Not considered genotoxic				

5. Risk Assessment

5.1 Environmental organisms

Risk characterization	EEC (microg/L)	NOEC * (mg/L)	MOE (NOEC * /EEC)	Product of uncertainty factors	Conclusion
	0	NOEC: 2.50	--	--	No immediate concern
Product of uncertainty factors (UF): --					
Recommendation : --					

NOEC* means NOEC, LOEC, EC₅₀, etc.

5.2 Human health

5.2.1 Repeated dose toxicity

Exposure route	Intake (microg/kgBW/ day)	NOAEL (mg/kgBW/day)	Risk characterization		
			MOE	Uncertainty factr	Conclusion
Inhalation	0.0012	No adequate data	--	--	--
Oral	0	LOAEL:0.25	--	--	No immediate concern
Total	0.0012	0.25 (Oral)	210,000	1,000	No immediate concern
Product of uncertainty factors (UF): Interspecies (10) * Intraspecies (10) * Using LOAEL (10) = 1000					

5.2.2 Reproductive and developmental toxicity

Since NOAEL of reproductive and developmental toxicity is larger than NOAEL of repeated dose toxicity, risk characterization of reproductive and developmental toxicity was not carried out.

5.2.3 Carcinogenicity

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5.2.4. Recommendation for Human Health

Although no adequate toxicity data for the inhalation route, MOE of total route of inhalation and oral is larger than the product of uncertainty factor. Thus, the substance is considered to be of no immediate concern for the moment, and low priority for further work.

6. Supplement

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